



US006403085B1

(12) **United States Patent**
Stimac

(10) **Patent No.:** US 6,403,085 B1
(45) **Date of Patent:** *Jun. 11, 2002

(54) **METHODS AND FORMULATIONS FOR CONTROL OF PESTS**

(75) Inventor: **Jerry L. Stimac**, Gainesville, FL (US)

(73) Assignee: **University of Florida Research Foundation, Inc.**, Gainesville, FL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/794,260**

(22) Filed: **Feb. 27, 2001**

Related U.S. Application Data

(63) Continuation-in-part of application No. 08/654,504, filed on May 28, 1996, now Pat. No. 6,254,864, which is a continuation of application No. 08/210,965, filed on Mar. 21, 1994, now Pat. No. 5,683,689, which is a continuation-in-part of application No. 07/999,185, filed on Dec. 30, 1992, now abandoned, which is a continuation of application No. 07/687,362, filed on Apr. 18, 1991, now abandoned, application No. 08/210,965, which is a continuation-in-part of application No. 07/999,186, filed on Dec. 30, 1992, now abandoned, which is a continuation of application No. 07/687,361, filed on Apr. 18, 1991, now abandoned.

(51) **Int. Cl.** **7** **A01N 69/00**

(52) **U.S. Cl.** **424/93.5; 424/404; 424/405; 424/439; 424/442; 424/499; 424/493; 424/489; 435/254.1; 504/117**

(58) **Field of Search** **424/93.5, 404, 424/405, 439, 442, 499, 493, 489; 504/117; 435/254.1**

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,925,663 A	5/1990	Stimac
4,992,275 A	2/1991	Lush
5,057,315 A	10/1991	Gunner et al.
5,057,316 A	10/1991	Gunner et al.
5,177,107 A	1/1993	Meer et al.
5,186,935 A	2/1993	Tucker
5,192,545 A	3/1993	Nakashima
6,254,864 B1 *	7/2001	Stimac et al.

FOREIGN PATENT DOCUMENTS

EP	0190844	8/1996
WO	9010389	9/1990

OTHER PUBLICATIONS

Akre, R.D. et al. [1989] "Carpenter Ants: Their Biology and Control" *Ext. Bull. Washington State Univ. Coop. Ext. Serv. EB 0818*: 1-6.

Archbold, E.F. et al. [1986] "Characterization of a Yeast Infection in the German Cockroach (Dictyoptera:Blattellidae)" *Environ. Entomol.* 15:221-226.

Archbold, E.F. et al. [1987] "Diagnosis of a Pathogenic Fungus (Deuteromycota:Hyphomycetes) of German Cockroaches, *Blattella Germanica* (Dictyoptera:Blattellidae): *J. Med. Entomol.* 24:269-272.

Beatson, S.H. [1972] "Pharaoh's Ants as Pathogen Vectors in Hospitals" *The Lancet* 1:425-427.

Brikman, L.I. et al. [1967] "Virulence of Entomopathogenic Spore-Forming Microorganisms in Relation to the Red House Ant, *Monomorium pharaonis*" *Tr. Tsent. Nauch.-Issled. Dezinfek Inst.* 18(2):70-77, abstract No. 46398j in *Chemical Abstracts* 70(11):227.

Cochran, D.G. [1989] "Monitoring for Insecticide Resistance in Field-Collected Strains of the German Cockroach (Dictyoptera: Blattellidae)" *J. Econ. Entomol.* 82:336-341.

Coler, R.R. et al. [1984] "Effect of an Oothecal Parasitoid, *Comperia merceti* (Compere) (Hymenoptera: Encyrtidae), on a Population of the Brownbanded Cockroach (Orthoptera: Blattellidae)" *Environ. Entomol.* 13:603-606.

Hagunbach, B.E. et al. [1989] "Bio. Con. Of the Amer. Cockroach (Orthoptera:Blattidae) w/Inundative Releases of *Tetrastichus hagenowii* (Hymenoptera: Eulophidae)" *J. Econ. Entomol.* 82:90-94.

Pereira et al. [1991] "Alginate and Cornstarch Mycelial Formulations of Entomopathogenic Fungi, *Beauveria bassiana* and *Metarhizium anisopliae*", *J. Economic Entomology* 84(6):1657-1661.

Rahmel-Alla, M., et al. [1989] "Studies on the Pathogenicity of Different Strains of *Bacillus cereus* for the Cockroach, *Leucophaea maderae*" *Journal of Invertebrate Pathology* 53:190-196.

Schal, C., et al. [1990] "Integrated Suppression of Synanthropic Cockroaches" *Ann. Rev. Entomol.* 35:521-551.

Thoms, E.M., et al. [1987] "Insecticide and Structural Modification Strategies for Management of Oriental Cockroach (Orthoptera:Blattidae) Populations" *J. Econ. Entomol.* 80:131-135.

Tsai, Y.H., et al. [1970] "Parasites of the German Cockroach (*Blattella Germanica*) in New York City" *The Journal of Parasitology* 56(2):375-377.

Verratt, J.M. et al. [1987] "A Hemocoelic Candida Parasite of the American Cockroach (Dictyoptera:Blattidae)" *J. Economic Entomology* 80(6):1205-1212.

Zervos, S. [1983] "Blatticola monandros n.sp. (Nematoda: Thelastomatidae) from the Blattellid Cockroach *Parellipidion pachycercum*" *New Zealand Journal of Zoology* 10:329-334.

* cited by examiner

Primary Examiner—Leon B. Lankford, Jr.

(74) **Attorney, Agent, or Firm**—Saliwanchik, Lloyd & Saliwanchik

(57) **ABSTRACT**

The subject invention concerns novel biopesticides and their use to control cockroaches, carpenter ants, and pharaoh ants. Specifically, highly virulent isolates of *Beauveria bassiana* in an agricultural composition, can be used to effectively control these pests. Exemplified are *Beauveria bassiana* No. 447, ATCC 20872, and *Beauveria bassiana* Sp111, ATCC 74038. Also described are unique formulations, which are highly effective for delivering biocontrol agents to target pests. By using these novel compositions, target pests can be controlled without the environmental and public safety hazards presented by chemical control agents.

20 Claims, 11 Drawing Sheets